

III-V COMPOUND SEMICONDUCTOR TRANSISTOR AND MANUFACTURE THEREOF FIELD-EFFECT

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Inventor(s): SUNAKAWA HARUO

Applicant(s): NEC CORP

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Abstract

PURPOSE: To form a FET of high quality having low source resistance of source, drain regions by providing the source, drain regions on the sidewall of plane 111A of a forward mesa structure formed on a semi-insulating substrate of plane 100 and a gate region on the surface of plane 100 of the top of the forward mesa structure.

CONSTITUTION: After the surface 12 of plane 100 to become a gate region of a semi-insulating GaAs substrate 11 is masked with an SiO₂ film 13 and the surface 14 of plane 111A to become source, drain regions is formed with etchant, the mask 13 is removed. Then, GaAs is ALE-grown on the substrate. An Se impurity is planely doped at each 10 layers of the GaAs.

Eventually, a WSi heat resistant gate electrode 17 is formed on the top 15 of the ALE-grown layer, and contact electrodes 18 to become source, drain are formed on the wall 16 of the ALE-grown layer side by alloying AuGe alloy and an n-type layer. Thus, the contact resistivity of the source, drain regions with the electrodes is extremely reduced, and preferable FET characteristics are obtained.